Strategy of non-Arctic Nations about the Development of Arctic Oil and Gas Resources

Hochang Jang and Jeonghwan Lee
Department of Energy and Resources, College of Engineering, Chonnam National University
Gwang-ju, Korea

ABSTRACT

This study discusses the non-Arctic nations’ strategy for the development of arctic oil and gas resources. According to the Circum-Arctic Resource Appraisal (CARA) by the U.S. Geological Survey (USGS, 2008), it was estimated that undiscovered oil and gas in the Arctic Circle accounted for, respectively, 13% (90 billion barrel; Bb) and 30% (1,670 trillion cubic feet; Tcf) of the world’s total resources. If we solve major challenges and problems in the Arctic, it will trigger exploration and production (E&P) development. It is expected that the Arctic oil and gas resources will become an alternative to supplying national future energy demand.

KEY WORDS: Arctic oil and gas resources; strategy; non-Arctic nations; exploration and production.

INTRODUCTION

According to the CARA by USGS, it was estimated that undiscovered oil and gas in the Arctic Circle accounted for, respectively, 13% (90 Bb) and 30% (1,670 Tcf) of the world’s total resources. Until recently, the Arctic oil and gas E&P was limited to onshore because it was difficult to economically produce oil and gas due to poor surroundings and long distance from market (Recinos, 2012). However, recent rising oil prices, approaching $100 per barrel, coupled with the global warming, which reduces the thickness and extent of sea ice in the Arctic, become factors accelerating the E&P development in the area. These allow the possibility of E&P in the Arctic offshore to increase.

CHARACTERISTICS OF ARCTIC OIL AND GAS RESOURCES

Environment of Arctic oil and gas E&P

The Arctic Circle is an area blessed with huge amounts of oil and gas resources, but faces many difficulties in developing those resources due to the harsh environment and technological limitations resulting from the arctic climate. Harsh working conditions due to the cold climate, the environmental problem resulting from the development of resources, social effects, weak accessibility from sea ice, and the far distance from industrial facilities, must be resolved before entering into the smooth development of resources (Benny et al., 2011). The natural environment of the Arctic Circle accompanied with extreme cold may strain steel materials, making them more susceptible to breaking. Thus, equipment created for a regular environment as well as various equipment such as rigs, floating production storage, offloading unit, and pipelines necessary for the development of resources require anti-icing designs.

In particular, because sea ice affects almost all maritime areas in the Arctic Circle, it must be taken into consideration. An ice management plan for processing floating ice and icebergs that occur from drilling and production must be thoroughly established (Keinonen, 2008). In certain areas, drilling is prohibited if a relief well is necessary in preparation of any eventualities such as oil spills (Clark and Weldon, 2011). On land, mining conditions may suffer due to the wetland tundra that occurs from melted ice in the summer, and soft ground formed when the ground melts into an unstable condition may sink because of the heavy equipment and structures. Therefore, conducting resource